PANA0001-100
(formerly PANA-0002)

PATENT APPLICATION

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

In the Claims:

Please cancel claims 9, 21 and 39-42 without prejudice to their presentation in another application.

Please amend claims 1, 2, 4, 43 and 48 and add new claims 55-60 as follows:

Claim 1 **(Currently amended)** A method of treating an individual who has a disease or disorder associated with one or more genetic mutations or undesirable alleles in genomic DNA of the individual, or preventing an individual from developing a disease or disorder associated with one or more genetic mutations or undesirable alleles in genomic DNA of the individual, by replacing a segment of genomic DNA that has a mutated sequence or undesirable allele with a corresponding segment of DNA that has a non-mutated sequence or desirable allele, the method comprising the step of

administering to the individual an effective amount of a plurality of polynucleotide molecules that are free of vector sequences,

wherein the plurality of polynucleotide molecules collectively comprises an essentially complete genome of the individual's species in polynucleotide molecules having about 100-3000 nucleotides, and

the plurality of polynucleotide molecules includes a polynucleotide molecule which comprises non-mutated sequences or desirable alleles corresponding to the genetic mutations or undesirable alleles in the genomic DNA in the individual, and

wherein at least some of the plurality of polynucleotide molecules including polynucleotide molecules which comprises the non-mutated sequences or desirable alleles are taken up by the cell of the individual which has the genetic mutations or undesirable alleles in genomic DNA,

are transported to the nucleus of the cell,

and the mutated sequences or undesirable alleles of genomic DNA is replaced by the non-mutated sequences or desirable alleles to correct the genetic mutation in the genomic DNA or incorporate the desirable allele into the genomic DNA.

Claim 2 **(Currently amended)** The method of claim 1 wherein the individual ~~who~~ has a disease or disorder associated with one or more genetic mutations in genomic DNA of the individual and is ~~treated by replacing one or more segments of~~ administered genomic DNA that comprises ~~have mutated sequences with corresponding segments of DNA that have a~~ non-mutated sequences.

Claim 3 **(Original)** The method of claim 2 wherein the individual who has a disease or disorder associated with one or more genetic mutation in genomic DNA of the individual selected from the group consisting of: cancer; heart and blood vessel diseases; peripheral blood vessel diseases; autoimmune diseases; diabetic conditions; neurodegenerative conditions; gastroenterological and hepatological diseases; mutagenic pathogen disorders; classic hereditary diseases; disorders due to exposure to mutagenic stimuli; aging and other multifactorial diseases.

Claim 4 **(Currently amended)** The method of claim 1 wherein the individual ~~who~~ has a disease or disorder associated with one or more undesirable alleles in genomic DNA of a cell of the individual and is ~~treated by replacing one or more segments of~~ administered genomic DNA that comprises ~~have the undesirable alleles with corresponding segments of DNA that have~~ desirable alleles.

Claim 5 **(Previously presented)** The method of claim 1 wherein the plurality of polynucleotide molecules are administered by a route of administration selected from the group consisting of: intravenous injection; intramuscular injection; intradermal injection; subcutaneous delivery; intraperatoneal delivery; topical delivery to mucosa; topical delivery to skin; delivery by lavage to mucosa; delivery by lavage to skin; ingestion per os; per rectum; intravaginally; intraocularly; intranasally, intratumorally; intracerebrally, intraocular injection, by inhalation and by delivery to the spinal cord.

Claim 6 **(Original)** The method of claim 1 wherein the plurality of polynucleotide molecules are administered by a regiment selected from the group consisting of: single dose, continuous infusion, multiple doses administered hourly, multiple doses administered daily, multiple doses administered every other day, multiple doses administered weekly.

Claim 7 **(Original)** The method of claim 1 wherein the plurality of polynucleotide molecules are administered in an amount of 0.01 – 16 g of polynucleotides having 200-3000 nucleotides each.

Claim 8 **(Original)** The method of claim 7 wherein the plurality of polynucleotide molecules are administered in an amount of 0.01 – 16 g of polynucleotides having 200-3000 nucleotides each with an average length of 300 – 1000 nucleotides.

Claim 9 **(Canceled)**

Claim 10 **(Original)** The method of claim 1 wherein the plurality of polynucleotide molecules are administered in an amount of 0.04 – 16 g of polynucleotides having 200-3000 nucleotides each.

Claim 11 **(Original)** The method of claim 10 wherein the plurality of polynucleotide molecules are administered in an amount of 0.4 – 16 g of polynucleotides having 200-3000 nucleotides.

Claim 12 **(Original)** The method of claim 1 wherein the plurality of polynucleotide molecules are DNA manufactured by amplifying DNA from donor genomic DNA using PCR with degenerative primers.

Claim 13 **(Original)** The method of claim 1 wherein the polynucleotide molecules are derived from autologous DNA collected at the patient's young age or at least before the disease or exposure to irradiation or chemical mutagens.

Claim 14 **(Original)** The method of claim 1 wherein the plurality of polynucleotide molecules are free DNA.

Claim 15 **(Original)** The method of claim 1 wherein the plurality of polynucleotide molecules are DNA in complexes with histones, polyamines or synthetic polycations.

Claim 16 **(Previously presented)** The method of claim 1 wherein at least 80% of polynucleotide molecules administered are about 200-3000 nucleotides in length.

Claim 17 **(Previously presented)** The method of claim 16 wherein at least 80% of polynucleotide molecules administered are about 200-3000 nucleotides in length and have an average length of about 300-1000.

Claim 18 **(Previously presented)** The method of claim 17 wherein at least 80% of polynucleotide molecules administered are about 200-3000 nucleotides in length and have an average length of about 500.

Claim 19 **(Previously presented)** The method of claim 16 wherein at least 80% of polynucleotide molecules administered are about 300-2000 nucleotides in length.

Claim 20 **(Previously presented)** The method of claim 19 wherein at least 80% of polynucleotide molecules administered are about 300-2000 nucleotides in length and have an average length of about 500.

Claim 21 **(Canceled)**

Claim 22 **(Previously presented)** The method of claim 19 wherein at least 80% of polynucleotide molecules administered are about 300-1000 nucleotides in length and have an average length of 500.

Claims 23-30 **(Canceled)**

Claim 31 **(Previously presented)** The method of claim 1 wherein the individual is a species selected from the group consisting of: human, non-human higher order primate, canine, feline, bovine, equine, ovine, porcine and avian.

Claims 32-42 **(Canceled)**

Claim 43 **(Currently Amended)** A method of treating ~~an~~ a human individual who has cancer, the method comprising the step of administering to the individual a therapeutically effective amount of a plurality of polynucleotide molecules that are free of vector sequences, wherein

the plurality of polynucleotide molecules collectively comprises an essentially complete human genome from an individual who does not have cancer;

each of the plurality of polynucleotide molecules having about 100-3000 nucleotides.

Claim 44 **(Previously presented)** The method of claim 43 wherein the plurality of polynucleotide molecules are free DNA.

Claim 45 **(Previously presented)** The method of claim 43 wherein at least 80% of polynucleotide molecules administered are about 200-3000 nucleotides in length.

Claim 46 **(Previously presented)** The method of claim 43 wherein at least 80% of polynucleotide molecules administered are about 200-3000 nucleotides in length and have an average length of about 300-1000.

Claim 47 **(Previously presented)** The method of claim 43 wherein at least 80% of polynucleotide molecules administered are about 300-2000 nucleotides in length.

Claim 48 **(Currently amended)** A method of treating ~~an~~ a human individual who has a disease or disorder associated with exposure to mutagenic stimuli, or preventing an individual from developing a disease or disorder associated with exposure to mutagenic stimuli comprising the step of

administering to the individual who has been exposed to mutagenic stimuli a therapeutically effective amount of a plurality of polynucleotide molecules that are free of vector sequences, wherein

the plurality of polynucleotide molecules collectively comprises an essentially complete human genome from an individual who is not suffering from the disease or disorder; does not cancer;

each of the plurality of polynucleotide molecules having about 100-3000 nucleotides.

Claim 49 **(Previously presented)** The method of claim 48 wherein the plurality of polynucleotide molecules are free DNA.

Claim 50 **(Previously presented)** The method of claim 48 wherein at least 80% of polynucleotide molecules administered are about 200-3000 nucleotides in length.

Claim 51 **(Previously presented)** The method of claim 48 wherein at least 80% of polynucleotide molecules administered are about 200-3000 nucleotides in length and have an average length of about 300-1000.

Claim 52 **(Previously presented)** The method of claim 48 wherein at least 80% of polynucleotide molecules administered are about 300-2000 nucleotides in length.

Claim 53 **(Previously presented)** The method of claim 48 wherein the mutagenic stimuli is ionizing radiation.

Claim 54 **(Previously presented)** The method of claim 48 wherein the mutagenic stimuli is a chemical mutagen.

Claim 55 **(New)** The method of claim 48 wherein the plurality of polynucleotide molecules are administered in an amount of 0.4 – 20 g of polynucleotides having 200-3000 nucleotides each.

Claim 56 **(New)** The method of claim 48 wherein the plurality of polynucleotide molecules are administered in an amount of 1 – 16 g of polynucleotides having 200-3000 nucleotides each.

Claim 57 **(New)** The method of claim 48 wherein the plurality of polynucleotide molecules are administered by a regiment selected from the group consisting of: continuous infusion, multiple doses administered hourly, multiple doses administered daily, multiple doses administered every other day, multiple doses administered weekly.

Claim 58 **(New)** The method of claim 43 wherein the plurality of polynucleotide molecules are administered in an amount of 0.4 – 20 g of polynucleotides having 200-3000 nucleotides each.

Claim 59 **(New)** The method of claim 43 wherein the plurality of polynucleotide molecules are administered in an amount of 1 – 16 g of polynucleotides having 200-3000 nucleotides each.

Claim 60 **(New)** The method of claim 43 wherein the plurality of polynucleotide molecules are administered by a regiment selected from the group consisting of: continuous infusion, multiple doses administered hourly, multiple doses administered daily, multiple doses administered every other day, multiple doses administered weekly.